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TRANSMISSION OF ACTIVATION IN PASSIVE METALS AS A MODEL OF THE PROTOPLASMIC OR NERVOUS TYPE OF TRANSMISSION

ONE of the most remarkable peculiarities of irritable living cells and cellular elements like nerve fibers is the readiness with which chemical or metabolic influence may be transmitted, without accompanying transfer of material, between regions differing in the degree or character of their physiological activity. Thus one region of a muscle or nerve which is in a physiologically more active or "stimulated" state transmits its activity regularly to another more or less distant resting region. The state of activity aroused in the irritable living system by a localized stimulus does not itself remain localized, but tends to spread; the region immediately stimulated imparts a similar state of activity to adjoining regions, these then activate the next adjoining, and in this manner a wave of activation or excitation is propagated over the entire irritable element, often to a long distance from its point of origin. In many cases, as in nerve, there is no decrease in the intensity of the local process as it passes along the element; its characteristics are reduplicated both qualitatively and quantitatively at each point which it reaches in its course; the local excitation is temporary and quickly dies out, each successive region of the tissue becoming active and then returning automatically to its original state of rest. Transmission of this type is known to physiologists as "conduction," and is exhibited in its most highly developed form in the nerves of higher animals. It is, however, by no means peculiar to these structures; any cell or cell element which reacts as a whole to a local stimulus illustrates the same phenomenon; some disturbance affecting the metabolism and functional activity of the living system is radiated from the original